What Is Claimed Is:

1.   A method for using empirical measurements of accesses to synchronization points within an application to construct a performance model for the application, comprising:

    modifying the application to record statistics related to the synchronization points within the application;

    running the application to produce the statistics related to synchronization points;

    constructing the performance model based upon the statistics; and

    using the performance model to predict a performance of the application.

2.   The method of claim 1,

    wherein constructing the performance model based upon the statistics involves constructing an analytic model for the application; and

    wherein using the performance model to predict the performance involves numerically solving the analytic model to predict the performance for the application.

3.   The method of claim 1,

    wherein constructing the performance model based upon the statistics involves constructing a simulation model for the application; and

    wherein using the performance model to predict the performance involves running the simulation model to predict the performance for the application.

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1   4.   The method of claim 1, wherein modifying the application involves

2   compiling the application with a profiling option in order to record the statistics

3   related to the synchronization points.

1   5.   The method of claim 1, wherein modifying the application involves

2   modifying the executable code of the application to record the statistics during

3   system calls that operate on the synchronization points.

1   6.   The method of claim 1, wherein the statistics include:

2   an identifier for a calling function;

3   an identifier for a mutual exclusion variable;

4   a time spent holding the mutual exclusion variable; and

5   a frequency of accesses to the mutual exclusion variable.

1   7.   The method of claim 1, wherein the statistics include a directed

2   call graph specifying an ordering of function calls.

1   8.   The method of claim 7, wherein constructing the performance

2   model involves constructing a queuing model, wherein each synchronization point

3   is a service center for jobs representing processes that circulate between service

4   centers in a manner specified by the directed call graph.

1   9.   A computer-readable storage medium storing instructions that

2   when executed by a computer cause the computer to perform a method for using

3   empirical measurements of accesses to synchronization points within an

4   application to construct a performance model for the application, the method

5   comprising:

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6   modifying the application to record statistics related to the synchronization

7   points within the application;

8   running the application to produce the statistics related to synchronization

9   points;

10   constructing the performance model based upon the statistics; and

11   using the performance model to predict a performance of the application.

1   10.   The computer-readable storage medium of claim 9,

2   wherein constructing the performance model based upon the statistics

3   involves constructing an analytic model for the application; and

4   wherein using the performance model to predict the performance involves

5   numerically solving the analytic model to predict the performance for the

6   application.

1   11.   The computer-readable storage medium of claim 9,

2   wherein constructing the performance model based upon the statistics

3   involves constructing a simulation model for the application; and

4   wherein using the performance model to predict the performance involves

5   running the simulation model to predict the performance for the application.

1   12.   The computer-readable storage medium of claim 9, wherein

2   modifying the application involves compiling the application with a profiling

3   option in order to record the statistics related to the synchronization points.

1   13.   The computer-readable storage medium of claim 9, wherein

2   modifying the application involves modifying the executable code of the

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3   application to record the statistics during system calls that operate on the

4   synchronization points.

1   14.   The computer-readable storage medium of claim 9, wherein the

2   statistics include:

3   an identifier for a calling function;

4   an identifier for a mutual exclusion variable;

5   a time spent holding the mutual exclusion variable; and

6   a frequency of accesses to the mutual exclusion variable.

1   15.   The computer-readable storage medium of claim 9, wherein the

2   statistics include a directed call graph specifying an ordering of function calls.

1   16.   The computer-readable storage medium of claim 15, wherein

2   constructing the performance model involves constructing a queuing model,

3   wherein each synchronization point is a service center for jobs representing

4   processes that circulate between service centers in a manner specified by the

5   directed call graph.

1   17.   An apparatus for using empirical measurements of accesses to

2   synchronization points within an application to construct a performance model for

3   the application, comprising:

4   a modification mechanism that is configured to modify the application to

5   record statistics related to the synchronization points within the application;

6   an execution mechanism that is configured to run the application to

7   produce the statistics related to synchronization points;

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8   a performance model construction mechanism that is configured to

9   construct the performance model based upon the statistics; and

10   a performance predicting mechanism that is configured to use the

11   performance model to predict a performance of the application.

1   18.   The apparatus of claim 17,

2   wherein the performance model construction mechanism is configured to

3   construct an analytic model for the application; and

4   wherein the performance predicting mechanism is configured to predict

5   the performance of the application by numerically solving the analytic model.

1   19.   The apparatus of claim 17,

2   wherein the performance model construction mechanism is configured to

3   construct a simulation model for the application; and

4   wherein the performance predicting mechanism is configured to predict

5   the performance of the application by running the simulation model.

1   20.   The apparatus of claim 17, wherein the modification mechanism is

2   configured to compile the application with a profiling option in order to record the

3   statistics related to the synchronization points.

1   21.   The apparatus of claim 17, wherein the modification mechanism is

2   configured to modify the executable code of the application to record the statistics

3   during system calls that operate on the synchronization points.

1   22.   The apparatus of claim 17, wherein the statistics include:

2   an identifier for a calling function;

1   an identifier for a mutual exclusion variable;

2   a time spent holding the mutual exclusion variable; and

3   a frequency of accesses to the mutual exclusion variable.

1   23.   The apparatus of claim 17, wherein the statistics include a directed

2   call graph specifying an ordering of function calls.

1   24.   The apparatus of claim 23, wherein the performance model

2   construction mechanism is configured to construct a queuing model, wherein each

3   synchronization point is a service center for jobs representing processes that

4   circulate between service centers in a manner specified by the directed call graph.

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